

Claims 1-15 were rejected under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Barry et al., U.S. Patent No. 6,403,181 ("Barry"). Applicants respectfully traverse this rejection.

35 U.S.C. § 112 Rejection

Claim 11 was rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Specifically, the Examiner asserts that the term "type" is indefinite because the term extends or narrows the claimed limitation. Although Applicants in no way concede the correctness of the rejection, Applicants have taken the Examiner's suggestion and deleted the word "type" from the claim. Applicants respectfully request the withdrawal of this rejection.

35 U.S.C. §§ 102(b) or 103(a) Rejections

Claims 1-15 were rejected under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Ahvenainen et al., U.S. Patent No. 5,326,835 ("Ahvenainen"). The Examiner asserts that Ahvenainen teaches a multi-stage process for producing polyethylene having a bimodal and/or broad molecular weight distribution in the presence of an ethylene polymerizing catalyst system in a multi-step reaction sequence. The Examiner also asserts that Ahvenainen teaches a number of the limitations of the dependent claims. The Examiner states however that although Ahvenainen does not disclose all the characteristics and properties of the compositions and pipes disclosed in Applicants' claims, because of the substantially identical process, the Examiner asserts that the claimed characteristics are inherent. Applicants respectfully disagree with the Examiner's assertions.

Applicants submit that Ahvenainen does not anticipate the pending claims. Claim 1 requires a number of limitations, including that the composition has a M_n of 8000-15000, a M_w of $180-330 \times 10^3$ and that the HMW fraction has a MW greater than 3500. The composition of Ahvenainen does not have these features. Applicants submit that these limitations are not, as the Examiner asserts, inherent in the composition of Ahvenainen. The Examiner seems to be implying that the characteristics that Applicants' invention does share with Ahvenainen dictate that all other characteristics be the same as well. This is not the case, the other characteristics

can certainly vary outside the claimed scope. Therefore, Ahvenainen does not anticipate the currently pending claims, and withdrawal of this rejection is respectfully requested.

Applicants also submit that Ahvenainen does not render the pending claims obvious. One of skill in the art would not have been motivated to modify the teachings of Ahvenainen to obtain the Applicants' invention. As mentioned above, the disclosure of Ahvenainen does not teach a composition that has a M_N of 8000-15000, a M_w of $180-330 \times 10^3$ and an HMW fraction with a MW greater than 3500. Furthermore, nothing in Ahvenainen suggests these characteristics. Specifically, with regard to the limitation that the HMW fraction has a MW greater than 3500, this means that the final multimodal polymer must not contain any copolymer material with a molecular weight below 3500. This is an important characteristic for pipes, because if the polymer contains copolymer with a molecular weight below 3500 then the properties of the pipe deteriorates. Thus, a pipe with a HMW fraction with a MW less than 3500 will have poor slow crack propagation resistance and fail the test ISO 13479:1997 of at least 500 hours at 4.6 MPA/80° C (specification, paragraph bridging pages 7 and 8).

Ahvenainen does not disclose or suggest that the MW of the HMW fraction should be greater than 3500, and does not indicated any properties that are effected thereby. Therefore Ahvenainen does not suggest a composition with the properties of Applicants' invention. Furthermore, because Ahvenainen does not disclose or suggest all of the claimed characteristics of Applicants' invention, it certainly does not suggest the combination thereof which is also important to the composition of the Applicants' invention. Therefore, Ahvenainen does not render Applicants' invention obvious and Applicants respectfully request withdrawal of this rejection.

Claims 1-15 were also rejected under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Barry et al., U.S. Patent No. 6,403,181 ("Barry"). The Examiner asserts that Barry teaches a resin with a bimodal molecular weight distribution or broad molecular weight distribution and is of high molecular weight. The Examiner also asserts that Barry teaches a resin with properties within the ranges of the present claims. The Examiner states however that although Barry does not disclose all the characteristics and properties of the compositions and pipes disclosed in Applicants' claims, because of the

substantially identical process, the Examiner asserts that the claimed characteristics are inherent. Applicants respectfully disagree with the Examiner's assertions.

Applicants submit that Barry does not anticipate the pending claims. Claim 1 requires a number of limitations, including that the composition has a MFR₂ of 0.2 to 1.2g/10 min, M_N of 8000-15000, a M_w of 180-330 x 10³, a M_w/M_N of 20-35, an LMW ethylene homopolymer fraction, a HMW ethylene copolymer fraction, and a HMW fraction with a MW greater than 3500. Barry does not disclose any of these features, and Applicants submit that these limitations are not, as the Examiner asserts, inherent in the composition of Barry because the shared characteristics do not dictate the unshared cues. Therefore, Barry does not anticipate the currently pending claims, and withdrawal of this rejection is respectfully requested.


Applicants also submit that Barry does not render the pending claims obvious. One of skill in the art would not have been motivated to modify the teachings of Barry to obtain the Applicants' invention. As mentioned above, the disclosure of Barry does not teach a composition with a MFR₂ of 0.2-1.2 g/10 min. The disclosure of Barry stipulates a MFR_{21.6} of 2-20 g/10 min. This MFR is measured at a much higher loading than the MFR₂ of 0.2-1.2 g/10 min. With regard to the limitation of an LMW ethylene homopolymer fraction, Barry discloses (col. 3, lines 25-26) that the resin is made with a bimetallic catalyst in a single reactor. This method of making the resin could not produce a multimodal polymer with a LMW ethylene homopolymer fraction and an HMW ethylene copolymer with a molecular weight above 3500. Not only does Barry not suggest a composition with the characteristics of Applicants' invention, but using the disclosure of Barry, it would be impossible to produce a composition of Applicants' invention, i.e., a composition with a HMW fraction that has a MW greater than 3500. As mentioned with respect to Ahvenainen, a HMW fraction that has a MW greater than 3500 is important, because if the composition contains a copolymer with a molecular weight below 3500 then the properties of the pipe deteriorates. Thus, a pipe with a HMW fraction with a MW less than 3500 will have poor slow crack propagation resistance and fail the test ISO 13479:1997 of at least 500 hours at 4.6 MPA/80° C (specification at paragraph bridging pages 7 and 8). Because Barry does not suggest a composition with the properties of Applicants' invention, it does not render the Applicants' invention obvious. Therefore, Applicants respectfully request the withdrawal of this rejection.

Conclusion

In view of the amendments and comments presented herein, favorable reconsideration in the form of a Notice of Allowance is respectfully requested.

Respectfully submitted,
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Marked up version of Claims

11. (Amended) A multimodal polymer composition as claimed in claim 10, wherein the polymerisation catalyst is a Ziegler-Natta [type] catalyst.